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How transformational leadership works during team interactions: A behavioral process analysis

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ABSTRACT

Transformational leadership is generally considered helpful for team functioning. However, the social dynamics underlying the benefits of transformational leadership remain elusive to date. To understand how and why transformational leadership can foster team functioning, this study focuses on leader–follower communication dynamics during team interactions. From the perspective of leadership as social problem solving, we argue that transformational leadership is linked to functional team problem-solving processes because transformational leaders use solution-focused communication (mediator model). In a sample of 30 videotaped problem-solving team meetings from two organizations, we coded transformational leadership style and the verbal behavioral interactions of leaders and team members over the course of their entire meetings (30,128 behavioral units in total). Multilevel results showed that transformational leadership was positively linked to functional problem-solving communication by team members. This positive relationship was mediated by leaders' solution-focused communication. Moreover, at the micro-level of conversational dynamics within the meeting process, lag sequential analysis revealed that leaders' ideas and solutions triggered subsequent solution statements by team members and inhibited counterproductive communication by team members, such as running off topic, criticizing, or complaining. We discuss theoretical and methodological implications for conceptualizing dynamic leader–follower processes as well as managerial implications for leading effective meetings in organizations.

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Transformational leadership has been linked to team functioning and team performance (e.g., Burke et al., 2006; Schaubroeck, Lam, & Cha, 2007; Wang, Oh, Courtright, & Colbert, 2011). To understand why transformational leadership may foster team functioning, previous research has focused on intermediate team states such as team commitment, empowerment, or shared team goals that benefit from transformational leadership and in turn can explain positive effects of transformational leadership on team functioning (Chi & Huang, 2014; Dionne, Yammarino, Atwater, & Spangler, 2004). However, what is currently missing from the literature is an understanding of the fine-grained social dynamics that can leverage the benefits of transformational leadership in teams (Chi & Huang, 2014; Wang et al., 2011).

To begin to pinpoint the micro-level dynamics underlying transformational leadership influence, this study focuses on the role of transformational leadership during team interactions, consistent with relational perspectives of leadership (e.g., Fairhurst, 2008; Ospina & Foldy, 2010; Uhl-Bien, 2006). By studying the effects of transformational leadership on team communication processes,

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we follow recent calls for leadership research at the level of actual events, rather than aggregating individual perceptions of leadership to the person level (Eberly, Johnson, Hernandez, & Avolio, 2013; Hoffman & Lord, 2013). Our focus on actual behavioral instances of both leaders and follower can yield more accurate insights into leader–follower dynamics in organizational teams. Moreover, by studying *temporal* communication dynamics between leaders and followers, we begin to consider the role of time in leadership (Bluedorn & Jaussi, 2008; Shamir, 2011).

Our study approach highlights communication as a key element of leader–follower processes (e.g., Cornelissen, Durand, Fiss, Lammers, & Vaara, 2015; Day, 2000; Shamir, 2007). We build on recent propositions to take an organizational discourse approach to leadership by focusing on the actual communicative behaviors exhibited by both leaders and team members during team interactions (Fairhurst & Connaughton, 2014; Fairhurst & Uhl-Bien, 2012). Specifically, we investigate the effects of transformational leadership on team members' communicative behaviors during team interaction processes. Moreover, research on the link between transformational leadership and counterproductive work behavior remains sparse (Wang et al., 2011). As such, in addition to understanding how transformational leaders can foster functional behaviors by team members, we are also particularly interested in whether transformational leaders can help diminish counterproductive communicative behaviors by team members during team interactions.

However, transformational leadership as an individual style may not suffice for eliciting favorable team member behaviors and inhibiting counterproductive member behaviors during team interactions. Rather, the benefits of transformational leadership seem to require a behavioral manifestation in terms of leaders' communicative behavior during team interactions (cf. De Vries, Bakker-Pieper, & Oostenveld, 2010). To date we know very little about *how* transformational leadership actually becomes effective in team settings. In other words, what we are currently missing is the behavioral mechanism, or mediating communicative vessel, by which transformational leadership can aid team functioning. To address this gap, we focus on leaders' solution-focused communication, a communicative expression of sensemaking (e.g., Zaccaro & Klimoski, 2001), as an intermediate process between transformational leadership and team member behaviors.

In sum, this study connects the dots between theorizing on transformational leadership style, leader–follower discourse (Fairhurst & Uhl-Bien, 2012), leadership as social problem solving (Zaccaro & Klimoski, 2001; Zaccaro, Rittman, & Marks, 2001), and the behavioral dynamics during team interactions (e.g., Kauffeld & Lehmann-Willenbrock, 2012). In a sample of 30 regular team meetings, we develop a multilevel model to examine how transformational leadership style affects team members' communicative behavior and highlight the underlying process of leaders' solution communication. Moreover, we provide a micro-process perspective of the behavioral linkages between leaders and followers within the temporal interaction processes, using lag sequential analysis. Our research approach answers calls for more dynamic, process-based conceptualizations of leadership (Dinh et al., 2014) and highlights the role of solution-focused leader behaviors as a necessary link between transformational leadership and follower behavior. We discuss theoretical implications for team leadership research and managerial implications for leading effective meetings.

Transformational leadership during team interactions

Transformational leadership is a leadership style that raises followers' awareness of the importance of task outcomes, activates higher-order needs, and motivates followers to transcend self-interests for the sake of the organization (Bass, 1985; Podsakoff, MacKenzie, Moorman, & Fetter, 1990; Yukl, 1989, 2013). Transformational leadership is defined as the “the process of influencing major changes in the attitudes and assumptions of organization members and building commitment for the organization's mission, objectives, and strategies” (Yukl, 1989, p. 269). Our specific conceptualization of transformational leadership in the present study follows the tradition of Podsakoff and colleagues (1990), who reviewed the literature on transformational leadership and addressed criticism about earlier measurement approaches by developing the transformational leadership inventory (TLI; Podsakoff et al., 1990). This instrument encompasses six key dimensions of transformational leadership, based on the previous literature: (1) identifying

Table 1
Meeting behaviors coding scheme with sample statements.

Solution-focused statements	Counterproductive statements
Defining the objective Vision, description of requirements “We need to find a way to improve that.”	Running off-topic/losing the train of thoughts in details and examples Examples irrelevant to the goal, monologues “I had been sick for three weeks, my finger was totally crushed, however, that was ten years ago, I guess.”
Solution identifying a (partial) solution “I suppose we need a new manual.”	Criticizing/running someone down Disparaging comments about others “You come over to visit us but you never clean-up.”
Describing a solution illustrating a solution “The manual should contain the most important procedures.”	Complaining Emphasizing the negative status quo “No one ever listens to us anyways!”
Arguing for a solution e.g., naming advantages of solutions “That way we won't forget anything important.”	
Problem with a solution objection to a solution “This is not possible because procedures change three times a year.”	

Note: Excerpt from the act4teams coding scheme for team meeting interaction. Only relevant behavioral codes for the present investigation are shown. For details, see Kauffeld and Lehmann-Willenbrock (2012).

and articulating a vision; (2) providing an appropriate model; (3) fostering the acceptance of group goals; (4) high performance expectations; (5) providing individualized support; and (6) intellectual stimulation (see Podsakoff et al., 1990, for a detailed description of their literature and the resulting six dimensions).

To date, the influence of (transformational) leadership in the context of team interaction processes remains largely unexplored. The lack of research on the actual *dynamics* of social processes in teams – such as the influence of transformational leadership on team members' behavior – is a problem that plagues the literature more broadly (for an overview, see Cronin, Weingart, & Todorova, 2011). Nevertheless, transformational leadership could play an important role for facilitating functional and preventing dysfunctional team interaction processes. Next, we differentiate functional and dysfunctional team member interaction processes and discuss how transformational leadership may affect each of these processes.

Functional and dysfunctional team micro-processes

Previous field research suggests that successful teams differ considerably from less successful teams in terms of the specific behavioral processes observable during their team interactions. The interaction processes of productive teams are characterized by behaviors such as generating ideas and solutions, managing the discussion process, and planning specific actions to be carried out (Lehmann-Willenbrock, Allen, & Kauffeld, 2013; Lehmann-Willenbrock, Meyers, Kauffeld, Neininger, & Henschel, 2011). Solution-focused communication in particular has been positively linked to satisfaction with team interactions as well as more proximal team performance outcomes (Kauffeld & Lehmann-Willenbrock, 2012). Table 1 provides an overview of the specific communicative behaviors that are the focus of the present study. Solution-focused verbal behaviors observed in previous research on team interaction processes are summarized in the left-hand column of Table 1. Specific verbal behaviors that express solution orientation include statements that define an objective (i.e., communicating a vision or creating a goal for the team), statements that represent a new idea or solution or that help further describe a solution, statements arguing for a solution, or statements that explain potential issues or problems connected to new ideas and solutions.

Previous research suggests that transformational leaders can inspire and motivate team members to work toward a collective vision and convey confidence that the team will achieve their goals, which in turn can lead to higher levels of team potency (Bass, 1985; Bass, Avolio, Jung, & Berson, 2003; Schaubroeck et al., 2007). Hence, transformational leadership should be beneficial for team problem-solving processes during team interactions. In other words, we expect that transformational leadership will promote functional team interaction practices such as solution communication.

In addition to understanding how transformational leaders can foster functional behaviors by team members, we are particularly interested in whether leader communicative behaviors can help diminish counterproductive behaviors among team members. A growing empirical research base highlights the issue of negative, counterproductive behaviors during team interactions. For example, instead of generating solutions and taking active steps towards implementing ideas, many teams spend substantial amounts of their face time complaining (about their working conditions, about their supervisor, etc.; e.g., Kauffeld & Meyers, 2009). Although complaining intuitively may serve a social bonding function, complaining behavior largely undermines team functioning (e.g., Lehmann-Willenbrock & Kauffeld, 2010; Schulte, Lehmann-Willenbrock, & Kauffeld, 2013). Moreover, negative procedural behaviors can also disrupt the team interaction process: when team members hold lengthy monologues or run off topic, this can quickly derail problem-solving and idea generation processes (Kauffeld & Lehmann-Willenbrock, 2012; Okhuysen & Eisenhardt, 2002). Finally, in the socioemotional communication area, criticizing others (i.e., disparaging or offending comments about other team members or other organizational members external to the team) can be similarly harmful for team problem-solving interactions. Previous research shows that counterproductive behaviors such as complaining, running off topic, or criticizing others are harmful not only for meeting satisfaction, but also for more distal team and organizational effectiveness outcomes (Kauffeld & Lehmann-Willenbrock, 2012). The right-hand column of Table 1 shows sample communicative behaviors for these different types of counterproductive team behaviors within team interaction.

Disruptive behaviors such as running off topic, criticizing others, or complaining tend to outnumber positive and productive behaviors substantially (Kauffeld & Lehmann-Willenbrock, 2012; Lehmann-Willenbrock et al., 2011). Hence, one of the leadership tasks during team interactions concerns finding ways to inhibit counterproductive team member communication. Transformational leadership could serve this inhibiting function. Research on the direct link between transformational leadership and counterproductive work behavior is sparse and more work is needed to understand this relationship (Wang et al., 2011). However, one previous study suggests a potential negative link between transformational leadership and counterproductive behavior in groups. In a field survey study, Brown and Treviño (2006) found that teams who rated their leaders as charismatic were less likely to engage in deviant workplace behavior. Presumably, because transformational or charismatic leaders model ethical conduct and motivate others to focus on collective rather than selfish interests, team members should be less inclined to show counterproductive behavior (Brown & Treviño, 2006). In the context of team interaction processes, this would mean that transformational leadership can diminish or inhibit the occurrence of counterproductive communication behavior by team members.

Taken together, we expect that transformational leadership can foster functional communicative team behaviors such as solution communication, and inhibit counterproductive communicative behaviors by team members during team interactions. We therefore hypothesize:

H1a. Transformational leadership style is positively linked to team members' solution-focused communication.

H1b. Transformational leadership style is negatively linked to team members' counterproductive communication.

Next, we discuss how the impact of transformational leadership on team members' actions may be facilitated or mediated by leaders' communicative behaviors.

Mediating role of leaders' solution communication during team interactions

Although previous research on the role of communication in the context of transformational leadership is scarce, one previous study points to the idea that transformational leadership influence may be grounded in specific communication styles (De Vries et al., 2010). This suggests that transformational leadership as an individual style does not suffice in terms of eliciting favorable team member responses. Rather, the benefits of transformational leadership seem to require a behavioral manifestation in terms of leaders' communicative behavior during team interactions. Generally speaking, transformational leadership is a rather abstract construct (cf. Brown & Keeping, 2005). When followers are asked to retrospectively rate their leaders' behavior, this requires a high level of abstraction from the followers (who need to reflect on their leader's behavior globally, rather than in a specific situation). Nevertheless, transformational leadership is typically assessed by post-hoc ratings provided by followers, allowing for potential negative memory effects and, thus, biased leadership behavior ratings (Graen, Rowold, & Heinritz, 2010). There is empirical evidence that these follower ratings are prone to several biases, for example due to sympathy for the leaders (Brown & Keeping, 2005; Rowold & Borgmann, 2013). As a result, we cannot be sure which specific leader behaviors are actually responsible for any beneficial effects of transformational leadership. Hence, one of the core contributions of our study lies in identifying solution-focused leader communication as an important underlying behavioral mechanism by which the positive effects of transformational leadership on team member behaviors unfold.

One way in which transformational leaders may develop a positive impact on team interaction processes is by using solution-focused communication with their team members. Before we discuss the potential mediating role of solution-focused leader communication within the transformational leadership–team member behavior link, let us clarify the conceptual distinction between transformational leadership and solution-focused communication. Table 2 provides an overview of key aspects to consider when distinguishing these two concepts. Whereas transformational leadership can be understood as a more abstract, superordinate, and long-term process of influencing follower attitudes (e.g., Yukl, 1989), solution-focused communication refers to concrete, directly observable, and situation-specific verbal behaviors embedded within social interaction processes (e.g., Kauffeld & Lehmann-Willenbrock, 2012). Both leaders and followers may engage in solution communication.

Moreover, although transformational leadership conceptualizations often imply communicative activities (e.g., providing followers with a vision; Podsakoff et al., 1990), the communicative content by which such activities are interpreted and rated is often based on emotional, gesticular, or mimic expressions (Antonakis, Fenley, & Liechti, 2011). In comparison, solution-focused verbal behavior is rated according to the functional quality of verbal statements and as such is rather “incorporeal.” In other words, solution-focused verbal behavior can be identified as such simply on a factual basis and without considering relational aspects that would be required for identifying transformational leadership. Finally, the two constructs differ considerably regarding their respective level of analysis, measurement approach, and measurement differentiation (see Table 2).

There are several reasons why we focus on leaders' solution-focused communication behaviors as an intermediate process in the transformational leadership–team member behavior link. First, according to Zaccaro and Klimoski (2001), leadership can be

Table 2

Conceptual distinction between transformational leadership and solution-focused statements.

	Transformational leadership	Solution-focused statements
Definition	The “process of influencing major changes in the attitudes and assumptions of organization members and building commitment for the organization's mission, objectives, and strategies” (Yukl, 1989, p. 269)	Observable verbal behaviors by leaders (or team members) who identify, describe, or argue for a solution (Kauffeld & Lehmann-Willenbrock, 2012)
Degree of abstraction	More abstract, superordinate, long-term	Concrete, directly observable, situation-specific behaviors
Differentiation	Six key dimensions of transformational leadership (e.g., Podsakoff et al., 1996; Schriesheim, Castro, Zhou, & DeChurch, 2006): <ul style="list-style-type: none"> • Articulating a vision • Providing an appropriate model • Fostering the acceptance of group goals • High performance expectations • Providing individualized support • Intellectual stimulation 	Specific verbal behaviors as categorized by the act4teams coding scheme (e.g., Kauffeld & Lehmann-Willenbrock, 2012; see Table 1 for more details): <ul style="list-style-type: none"> • Defining the objective • Solution • Describing a solution • Arguing for a solution • Problem with a solution
Communicative content and level	Mostly nonverbal (emotional, gesticular, mimic; Antonakis et al., 2011)	Exclusively verbal (“incorporeal”)
Level of analysis	Relational level, “between the lines”	Factual level
Measurement approach in the current study	Aggregate ratings of leader's behaviors (across interactions with various team members), in line with the standard approach in research on transformational leadership (e.g., Wang & Howell, 2012; Wang et al., 2011)	Micro-level interaction sequences (or patterns) between leaders and team members, in line with micro-process research on team interaction dynamics (e.g., Kauffeld & Lehmann-Willenbrock, 2012; Kauffeld & Meyers, 2009; Lehmann-Willenbrock et al., 2011, 2013)
	Transformational leadership inventory (TLI; e.g., Heinritz & Rowold, 2007; Podsakoff et al., 1990)	Act4teams coding scheme (e.g., Kauffeld & Lehmann-Willenbrock, 2012; Lehmann-Willenbrock & Allen, 2014; Lehmann-Willenbrock et al., 2011, 2013)

understood as “social problem solving, where leaders are constructing the nature of organizational problems, developing and evaluating potential solutions, and planning, implementing, and monitoring selected solutions within complex social domains” (Zaccaro & Klimoski, 2001, p. 8; see also Fleishman et al., 1991; Zaccaro et al., 2001). This understanding of leadership in teams highlights the role of solution-focused communication behaviors.

Second, solution-focused leader behaviors can be subsumed under the general notion of sensemaking (e.g., Jacobs & Jaques, 1987; Zaccaro & Klimoski, 2001; Maitlis, 2005; Scott, Allen, & Rogelberg, 2015). Sensemaking is “about such things as the placement of items into frameworks, comprehending, redressing surprise, constructing meaning, interacting in the pursuit of mutual understanding, and patterning” (Weick, 1995, p. 6). In fact, Zaccaro and colleagues (2001) discuss sensemaking as the critical point in understanding how leaders can influence a team. During team interaction processes, transformational leaders in particular can facilitate sensemaking for team members by helping them interpret events and available data, developing a shared mental representation of a problem, helping team members generate solutions to identified problems, developing strategies and creating commitment toward implementing those solutions, and by conveying a vision for improving the team’s collaboration and performance outcomes (Dionne et al., 2004; Morgeson, DeRue, & Karam, 2010; Zaccaro et al., 2001).

Third, according to social learning theory, the way in which humans learn new behavior is through the imitation of role models (e.g., Bandura, 1977). In situations of ambiguity, role models can set norms for appropriate behavior, thus triggering behavioral imitation. In team interaction settings such as team meetings, which are often held for problem-solving purposes, such ambiguity could put leaders in a position of leading by (behavioral) example. Thus, when leaders communicate about ideas and solutions, team members may – explicitly or implicitly – perceive this as appropriate behavior, and follow accordingly with their own ideas and solutions to problems. This notion relates to previous findings on emotional convergence between leaders and followers, with several studies showing that followers adapt their affective states to those of their leader (e.g., Sy & Choi, 2013; Sy, Côté, & Saavedra, 2005). Some studies suggest that such contagion effects can also take place in the context of verbal behaviors (Cheshin, Rafaeli, & Bos, 2011). Thus, when followers notice that their (transformational) leader comes up with ideas and solutions, they will likely adapt and follow suit with similar verbal behavior.

Similarly, leaders’ solution-focused communication may also help us explain how transformational leadership relates to counterproductive communicative behaviors by team members. Specifically, we argue that leaders’ solution-focused verbal behaviors are an important underlying reason why transformational leaders can inhibit dysfunctional team member behaviors during team interactions. Interpersonal theory (e.g., Kiesler, 1996) appealingly suggests that this might be the case. According to interpersonal theory, social interactions (such as leader–follower interactions) are characterized by behavioral interdependencies between social actors. The behavior shown by one interactant limits the behavioral options of the other interactant (e.g., Kelley et al., 2003; Kiesler, 1996; see also Janiro, Lehmann-Willenbrock, & Kauffeld, in press). In the context of leader–follower dynamics during team interactions, this core tenet of interpersonal theory implies that leaders’ communicative behaviors can not only foster functional team member behaviors, but can also diminish the likelihood of counterproductive team member behaviors. When transformational leaders use solution-focused communication, they can set a positive example that should discourage dissimilar or divergent behaviors by team members. Empirical findings from dyadic interaction settings generally support the notion that communication partners adapt their behavior to one another, rather than showing divergent or dissimilar behavior (for an overview, see Burgoon, Stern, & Dillman, 1995).

Taken together, we argue that leaders’ solution-focused communication constitutes an important underlying reason or mediating process for explaining how transformational leadership style can aid positive behaviors and inhibit counterproductive behaviors by team members during team interaction processes. We therefore hypothesize:

H2a. The effect of transformational leadership style on team members’ solution-focused communication is mediated by leaders’ solution-focused communication.

H2b. The effect of transformational leadership style on team members’ counterproductive communication is mediated by leaders’ solution-focused communication.

Leader–follower interaction patterns

Generally speaking, leadership research should account for relationality, in terms of the dynamic social interaction between leaders and followers (Bradbury & Lichtenstein, 2000; Uhl-Bien & Ospina, 2012). However, previous research on transformational leadership has mostly relied on aggregated perceptions of leadership behavior and hence cannot account for the moment-to-moment interaction between leaders and followers at the level of actual communicative events (e.g., Graen et al., 2010; Hoffman & Lord, 2013). Studying actual behavioral instances between leaders and their followers allows us to capture the dynamic temporal contingencies that characterize leader–follower interactions (cf. Shamir, 2011). In other words, we aim to study leader and follower behaviors as they happen and affect each other in real time and at the micro-level of conversational events (cf. Eberly et al., 2013; Hoffman & Lord, 2013).

Understanding the fine-grained behavioral dynamics of how more or less transformational leaders can influence team member behaviors requires a temporal perspective of the team interaction process. The contemporary perspective of team processes argues for a central focus on team temporal dynamics unfolding in a proximal task and social context as teams work toward task accomplishment (e.g., Cronin et al., 2011; Ilgen, Hollenbeck, Johnson, & Jundt, 2005; Kozlowski, Chao, Grand, Braun, & Kuljanin, 2013). Specific behaviors such as coming up with new ideas are embedded not only within the social context of the team, but also within the temporal process of team interactions. Hence, in order to understand the fine-grained communicative dynamics by which leaders can impact team members’

behaviors, we need to study both leaders' and team members' communicative behaviors as they unfold over time. We now turn our attention to specific behavioral linkages between leaders and followers within the micro-processes of team interactions.

Our final set of hypotheses “zooms in” to examine the event-based moment-to-moment dynamics between leaders and followers within the team interaction process. According to interpersonal theory, any specific behavior in an interaction process between two or more people invites specific responses (e.g., Kiesler, 1996; Sadler & Woody, 2003). Consequently, interacting parties tend to adjust their communicative expressions to one another during their interaction process (e.g., Hale & Burgoon, 1984). In other words, specific communication behaviors will likely elicit similar behavioral responses. For example, previous research has identified reciprocal behavioral patterns during coach-client interactions (Ianiro et al., *in press*) and in group interaction settings (Barsade, 2002; Lehmann-Willenbrock et al., 2011). In the context of team problem-solving interactions, these previous findings suggest behavioral contingencies between leaders and followers, such that leaders' solution-focused behaviors could invite subsequent solution-focused behaviors by team members.

Although to date no research efforts have been made to empirically test behavioral linkages between leaders and followers during team interaction processes, findings from leaderless team interactions in the organizational setting suggest similar behavioral linkages. For example, Kauffeld and Meyers (2009) found that solution-focused verbal behaviors were often followed in kind. Although these previous findings refer to team members among themselves, they do suggest that leaders could foster positive, functional communication among team members by offering solutions themselves and thus triggering solution sequences or patterns within the team meeting process. Methodologically, the idea of leader behaviors triggering reciprocal follower behaviors (i.e., behaviors by team members) within the team interaction process aligns with earlier findings using sequential analysis. In a laboratory setting, Komaki and Citera (1990) found reciprocal interaction patterns between randomized manager-subordinate pairs engaged in performance monitoring. Similarly, in a study of interactions during student group meetings, Goltz (1993) found that student leaders' monitoring behaviors triggered specific performance report behaviors in subordinates. Although it remains to be seen whether similar interaction patterns can be observed in actual organizational samples, we can extrapolate from these earlier findings that solution statements by leaders may trigger subsequent solution-focused communication in team members as well. We thus hypothesize:

H3a. Within the team interaction process, leaders' solution-focused statements elicit subsequent solution-focused statements by team members.

Moreover, at the event level of moment-to-moment conversational behaviors, we argue that solution-focused behaviors by leaders may also help diminish counterproductive meeting behavior such as running off topic, criticizing, or complaining by team members. The reason why we think counterproductive behaviors should be less likely immediately after a solution-focused statement by the meeting leader is grounded in the reciprocity norm during interactions (e.g., Altman, 1973; Burgoon, Dillman, & Stern, 1993; Gouldner, 1960). In the context of communicative behavior, the reciprocity norm is “the shared expectation that the recipient of a resource is obligated to and at some time will return to the giver a resource roughly equivalent to that which was received” (Rolloff & Campion, 1985, p. 174). Concerning leaders and team members during team interaction processes, the reciprocity norm implies that solution-focused behavior should not be followed by counterproductive, negative behavior such as running off topic, criticizing, or complaining because this would violate the rules of reciprocity. Similarly, social exchange theory (e.g., Blau, 1964) would suggest that helpful behavior by leaders such as idea generation engenders a felt obligation to respond in similar ways (see also Baran, Shanock, Rogelberg, & Scott, 2012). Such obligations resulting from social exchange may be particularly strong when considering a specific focus of social exchange, as in the case of specific leaders interacting with specific followers (Lavelle, Rupp, & Brockner, 2007). Taken together, the above perspectives uniformly suggest that negative behaviors by team members should be less likely after a solution-focused statement by the leader. In other words, when leaders express ideas or solutions, they can inhibit subsequent counterproductive meeting behaviors. Our final hypothesis posits:

H3b. Within the team interaction process, leaders' solution-focused statements inhibit subsequent counterproductive statements by team members such as running off topic, criticizing others, and complaining.

Team meetings in organizations as a focal research context

To empirically investigate our research model, we focus on team meetings as a core interactional context. During team meetings, leader–follower dynamics come into play, allowing us to observe the effects of transformational leadership in a dynamic team setting. Team interactions during meetings are a place where leader–follower relationships are created, maintained, or altered (Baran et al., 2012). From the perspective of leadership as social problem solving (Zaccaro & Klimoski, 2001), team meetings can be viewed as non-routine events during which leaders help the team construct and define problems, generate solutions, and plan the necessary steps for implementing new ideas and solutions (Fleishman et al., 1991; Zaccaro, 1995; Zaccaro et al., 1995). In fact, Ravn (2013) discusses meetings as a “platform for visionary and inspiring leadership” (p. 169). As such, team meetings present a salient organizational context for studying the ways in which transformational leadership can impact team member behaviors.

Method

We videotaped seventeen regular team meetings in an organization from the automotive supply industry and thirteen team meetings in a medium-sized electronics industry organization in Germany. Prior to our data gathering, both organizations had

implemented a Continuous Improvement Process (CIP; e.g., [Liker & Franz, 2011](#)), which included regular problem-solving team meetings. As part of the CIP, the teams elect group leaders via a majority vote. This vote is based on interpersonal acumen rather than seniority, as indicated by the average age and tenure of the group leaders in comparison to the other team members (see the descriptive statistics in our sample description below). In the automotive supply organization, the group leaders serve a 1-year term; in the electronics organization, they serve as leaders until they decide to step down, or until they switch to a different team. In addition to organizing and leading the regular team meetings (at least once a month), their leadership tasks include representing the team in the organization, setting a positive example, communicating and coordinating with other teams in the organization, participating in managerial meetings or focus groups, mediating in case of conflict between team members, and relating any concerns or suggestions by team members to the formal supervisor (i.e., next management level).

Note that because the relational process between leaders and followers can take place in both formal and informal leadership settings ([Yukl, 2013](#)), leader–follower dynamics can be detected whether meeting leaders are formal supervisors or elected group members. In the particular context of team meetings, the leaders in our study are responsible for preparing the meeting agenda, documenting meeting results, ensuring that ideas from the meeting are implemented into practice and mediating in the case of conflict or disagreement between team members. As such, they have an important role in promoting team spirit, facilitating good teamwork, and ensuring that the team reaches performance targets (concerning the role and tasks of group or meeting leaders in CIP contexts, see [Bessant & Francis, 1999](#); [Imai, 2012](#); [Liker & Maier, 2006](#)). Prior to our data gathering, all leaders had completed a 2-day group facilitation training. This training was not part of our data gathering but rather constitutes an internal training process in the two companies. Training components include general input regarding the value and functions of teamwork, knowledge about the group leader's authorization and responsibilities, group facilitation techniques, conflict management, and steps in problem-solving and idea implementation. It is mandatory for newly elected leaders to participate in this training. Moreover, both organizations offered additional workshops for the group leaders (for advanced group leadership and to exchange ideas and experiences).

Sample

Our sample included a total of 30 teams ($N = 153$ team members, $N = 30$ leaders). The average number of participants per team meeting was 6.10 ($SD = 1.09$) including the leader. 88.2% of the team members were male, which corresponds to the reality of the industries involved in our sample. Team members' average age was 37.35 years, ranging from 17 to 62 ($SD = 10.39$) and their organizational tenure ranged from 0 to 42 years, with an average of 11.31 years ($SD = 9.04$). On average, the team members worked in their respective teams for 9.93 years ($SD = 9.19$). Leaders' average age was 33.73 years, ranging from 20 to 57 ($SD = 8.91$). Twenty-six out of 30 leaders were male (86.7%). On average, leaders' organizational tenure was 10.27 years ($SD = 6.48$) and they had worked in their respective teams for 10.98 years ($SD = 9.80$).

Procedure

Data were collected during regular CIP team meetings. The teams who participated in our study regularly meet (at least once a month) to discuss any issues or errors encountered in their work processes. Thus, all meetings focused on a problem-solving topic (e.g., “How can we improve our product quality?”). Meetings were videotaped in an unobtrusive manner and participants were asked to ignore the camera (for a similar procedure, see [Kauffeld & Lehmann-Willenbrock, 2012](#)). The meetings lasted for approximately 1 h each.

Ratings of transformational leadership style

To measure transformational leadership style, we used a psychometrically validated German version ([Heinitz & Rowold, 2007](#); [Krüger, Rowold, Borgmann, Staufenbiel, & Heinitz, 2011](#)) of the transformational leadership inventory ([Podsakoff, MacKenzie, & Bommer, 1996](#)). An independent rating perspective was applied. The items of the transformational leadership inventory were adapted in order to reflect this independent rating perspective. Transformational leadership style was assessed by 22 items (e.g., “...paints an interesting picture of the future for the group”; rated on a 5-point Likert-scale ranging from 1 = strongly disagree to 5 = strongly agree). Raters were six graduate students who received extensive training. Note that this group of raters comprised different students than the ones who coded the verbal interaction behavior of leaders and followers during the meeting (i.e., act4teams coding scheme; see below). Moreover, note that transformational leadership style was *not* coded from transcribed interactions. Instead of using transcripts, the raters coded transformational leadership directly from the videos. This approach is in line with findings that video- and audio-based observations can capture interpersonal constructs more accurately than transcribed interactions ([Nicolai, Demmel, & Farsch, 2010](#)). In order to establish inter-rater agreement, one team meeting was rated by all six raters. Following recommendations by [McGraw and Wong \(1996\)](#), we calculated inter-rater agreement and average deviation indices ([Dunlap, Burke, & Smith-Crowe, 2003](#)). We chose AD rather than r_{wg} as an indicator of agreement because the ratings referred to one single target judgment ([Schmidt & Hunter, 1989](#); for a detailed discussion, see [LeBreton & Senter, 2008](#)). The results revealed high consensus for ratings of transformational leadership ($ICC1 = .28$; $ICC2 = .66$; $AD = .81$). Upon establishing this inter-rater agreement, raters were assigned randomly to code leaders' expressed transformational leadership style in the different team meetings.

Coding meeting interaction behaviors

The videotaped meetings were analyzed using the act4teams coding scheme (e.g., Kauffeld & Lehmann-Willenbrock, 2012). The behavioral codes that are relevant for the present research as well as sample behaviors for each observational code are shown in Table 1. Using the act4teams coding scheme for team problem-solving interactions (e.g., Kauffeld & Lehmann-Willenbrock, 2012), solution-focused verbal behavior can be coded into one of five distinct behavioral categories, namely “defining the objective,” “solution,” “describing a solution,” “arguing for a solution,” or “problem with a solution” (see Table 1). If participants describe visions or formulate requirements for a new solution, this is coded as defining the objective (e.g., “We would need a fast success”; “That would need to be defined some place”). Identifying (partial) solutions and illustrating these solutions is depicted by the codes solution (e.g., “Someone has to be there at 6 o'clock then”; “The tool box should be checked and cleaned once a month”) and describing a solution (e.g., “We need color as identification, since writing will be hard to notice as soon as the tools get dirty”; “Once a month like every first Friday, for example”). When statements describe a deeper analysis of a proposed solution, this is coded as either arguing for a solution (e.g., “If someone is responsible, he will check”; “If a complete tool box is there you know for sure that all tools will be inside”) or problem with a solution (e.g., “Not possible because we are too many people”; “This will become a problem though because sometimes I'm in this shift and sometimes I'm in that shift”).

The unitizing task and subsequent interaction coding was carried out using INTERACT software (Mangold, 2010) and a specially designed keyboard. The coders worked directly from the digitalized video. All communicative behaviors (i.e., statements by leaders and statements by followers) were coded. The interaction coding was conducted by a pool of five trained coders, all of whom were graduate students in Psychology. All coders underwent an extensive training (200 h) prior to analyzing the present data. Coders were blind to the study hypotheses. To calculate inter-rater reliability, a subset of the data was coded twice by different coders (6 videos; 2795 behavioral units in total). To calculate inter-rater reliability for the interaction coding, we followed a procedure proposed by Fleiss (1971) by which κ can be generalized to several coders and obtained a value of Fleiss' $\kappa = .81$. To account for any differences in meeting length, we related all observed meeting behaviors to a 60-minute period by dividing the frequency of each specific verbal behavior by the meeting length in minutes and then multiplying this number by 60. Overall, we observed 30,128 behavioral units in total.

For purposes of simplification, we combined the five different types of solution-focused statements (describing objectives, new solutions, describing solutions, arguing for solutions, or discussing problems with a solution) to form one observation code (solution-focused communication). To test whether this combination was methodologically feasible, we analyzed the internal consistency using individual-level overall frequencies of these different verbal behaviors (related to a 60-minute period, to account for differing meeting length, respectively). This was indeed the case (Cronbach's $\alpha = .80$). Moreover, previous research has linked all of these five behavioral codes to positive team outcomes showing that they are all important for problem-solving (Kauffeld & Lehmann-Willenbrock, 2012). Similarly, counterproductive meeting behaviors (running off topic, criticizing others, or complaining) were combined to form one observation code also (Cronbach's $\alpha = .71$).

Multilevel analyses

Multilevel modeling was used to test H1a to H2b. We followed the multilevel structural equation modeling approach (MSEM; Preacher, Zyphur, & Zhang, 2010) for our multilevel analyses which allows us to recognize the partial interdependence among our study variables as individuals are nested within teams, and also permits us to investigate all linkages among our study variables simultaneously. All multilevel analyses were run with Mplus version 7.0 (Muthén & Muthén, 1998–2012), using the type = twolevel option implemented in the software and maximum likelihood estimation with robust standard errors (MLR) which is the MPlus default for multilevel analysis. Team membership was used as cluster variable.

Team members' meeting behaviors were observed for each team member individually. Thus, they have individual and team level variance. In a two-level design, as in our study, it is important to partition the variance of such individual variables in clustered data into their within (cluster) component and between (cluster) component (see Preacher et al., 2010, for a detailed explanation). We allowed for residual covariance among our outcome variables at both levels of analysis as standard setting for (multilevel) path analysis in MPlus. Solution-focused leader communication and transformational leadership style, however, were located at the team level only. This means they only have a between variance component.

We used multilevel regression analyses with random intercepts and fixed slopes to test H1a and H1b. Our specified model (model 1) included one predictor variable (i.e., transformational leadership style), two outcome variables (i.e., team members' solution-focused communication and team members' counterproductive communication), and four covariates (i.e., age, gender, tenure, and team meeting size). In order to test H2a and H2b, we added leader's solution-focused communication as a mediating variable (model 2). Because leaders' solution-focused communication and transformational leadership style were team level variables and team members' communicative behaviors were individual level variables, our mediation model (model 2) had a 2-2-1 design.

The advantage of the MSEM approach using MPlus is that both within-team and between-team variance and covariance are modeled separately and that MPlus uses the correct standard errors for within-team and between-team effects (Preacher et al., 2010). Thus, the between part of the model gives estimates of relationships at the team level, whereas the within part of the model describes the variation and covariation of variables within the teams. MPlus allows for the simultaneous and accurate estimation of the same-level effects (2-2; i.e., the link between transformational leadership style and leaders' solution-focused communication) as well as of cross-level effects (2-1; i.e., the effect of transformational leadership style and leaders' solution-focused communication on the between-team portion of team members' verbal meeting behaviors). The mediation effect in our model strictly functions at the

between group level of analysis because a between-group level variable cannot account for individual within-group differences (Preacher et al., 2010).

Beyond our postulated paths, we controlled for individual team member characteristics (i.e., age, gender, and tenure) that have been found to affect team processes. Gender was dummy coded (0 = female, 1 = male). Age, gender, and organizational tenure were group-mean centered as recommended by Raudenbush and Bryk (2002) and included as control variables at the within level. Moreover, we controlled for team meeting size using the total count of the number of meeting participants. Team meeting size was included as a covariate at the team level as it is a variable with only between variance.

We used multiple indicators to evaluate model fit, including both overall model fit indices (i.e., root mean square error of approximation, RMSEA; comparative fit index, CFI; Tucker–Lewis index, TLI) and level specific indices (standardized root mean square residuals for within-model, SRMR-W; standardized root mean square residuals for between-model, SRMR-B).

Lag sequential analysis

To understand temporal contingencies between leaders' and followers' communicative behaviors during the team meeting process (H3a and H3b), we performed lag sequential analysis using INTERACT software. In order to interpret our results meaningfully, we combined the coded data from all team meetings into one data pool (Bakeman & Gottman, 1997; for a similar procedure, see Kauffeld & Meyers, 2009; Lehmann-Willenbrock et al., 2011, 2013). Lag sequential analysis detects temporal patterns in sequentially recorded behavioral events (e.g., Bakeman & Quera, 2011; Goltz, 1993). We used this method to determine whether a certain sequence of behavior (e.g., a leader's solution statement followed by a follower's solution statement) occurred above chance in our data. To differentiate between leader statements and team member statements, we linked each coded behavior with who was speaking (i.e., the observed verbal behavior "solution" becomes either "leader-solution" or "follower-solution").

To determine how often each type of statement (by leaders or by followers, respectively) was followed by another type of statement, we generated an interaction sequence matrix using INTERACT software. So-called first-order transitions or interacts occur when one statement directly follows the previous one (lag1). We enumerated each lag1 transition frequency and calculated transition probabilities, which indicate the probability that a specific behavior B occurs after a particular given behavior A (e.g., Benes, Gutkin, & Kramer, 1995). In other words, transition probabilities indicate the likelihood that B is triggered by A within the interaction process. Because transition probabilities are confounded with the base rates of the events that follow, a high transition probability is not per se an indication of an above chance transition frequency. To examine whether any observed transition probability differed from the unconditional probability for the respective event that followed, we used the z-statistic as a statistical check (Bakeman & Gottman, 1997). A z-value larger than 1.96 or smaller than -1.96 implies that a behavioral sequence occurred above chance in our data (for more details on lag sequential analysis and applications for analyzing team interactions, see Bakeman & Quera, 2011; Lehmann-Willenbrock et al., 2011, 2013; Meinecke & Lehmann-Willenbrock, 2015).

Results

Means, standard deviations, and intercorrelations for all variables were calculated with SPSS and are presented in Table 3. Behavioral data is presented as overall frequencies per 60-minute period in the meetings. As typical for behavioral data, we observed a considerable range of frequencies in our sample. The observed frequencies of solution-focused team member statements ranged from zero to 99 statements per hour and the observed frequencies of counterproductive team member statements ranged from zero to 89 statements per hour. Thus, some team members engaged more actively in the discussion than others. Similarly, leaders' solution-focused communication showed a high range, too (from 3 to 111 statements per hour). Interestingly, we observed hardly any counterproductive leader statements in our study. One third of the leaders voiced no counterproductive statements at all while the median was 2.5 counterproductive statements per hour by the leaders. Due to these small frequencies, we refrained from running any additional analyses on counterproductive leader communication.

Table 3

Means, standard deviations, minimum, maximum, and intercorrelations of study variables.

Variable	M	SD	Min	Max	1	2	3	4	5
Individual level									
1. Team members' solution-focused communication	21.52	19.99	0	99	–				
2. Team members' counterproductive communication	6.06	11.89	0	89	.13	–			
3. Age	37.35	10.39	17	62	.02	.19*	–		
4. Gender (0 = female, 1 = male)	.88	.32	0	1	.18*	–.06	–.14	–	
5. Tenure	11.31	9.04	0	42	.06	.15	.60***	–.01	–
Team level									
1. Transformational leadership style	2.67	.64	1.59	3.86	–				
2. Leaders' solution-focused communication	40.2	32.94	3	111	.61***	–			
3. Team meeting size	6.10	1.09	4	7	.12	.24	–		

Note: $N = 153$ team-members, $N = 30$ teams. Communicative behaviors are calculated as overall frequencies per 60-minute period in the meeting.

* $p < .05$.

** $p < .01$.

*** $p < .001$ (two-tailed).

Multilevel analyses

Prior to testing our multilevel hypotheses, we calculated intraclass correlation coefficients (ICC1) for team members' solution-focused communication and team members' counterproductive communication. ICC1 indicates the amount of variance in individual level responses that can be explained by group level properties (i.e., team membership). We run null models with no predictor for both level 1 outcome variables to compute ICC1. Solution-focused team member communication showed an ICC1 of .13 and counterproductive team member communication showed an ICC1 of .16. Thus, results support the notion to use multilevel modeling to consider our nested data structure.

To test hypotheses 1a and 1b, on the within-level of analysis, we estimated within-level (residual) variance for both outcome variables of interest (i.e., solution-focused team member communication and counterproductive team member communication). Moreover, we regressed both outcome variables on age, gender, and tenure. At the between-level of analysis, we estimated the between-level (residual) variance of our outcome variables as well as of transformational leadership style. Finally, we regressed team members' verbal meeting behaviors on transformational leadership style and on team meeting size as a control. In the following, we report unstandardized regression coefficients obtained by MPlus. Additional standardized coefficients and results for all variables including control variables are presented in Table 4. Results showed that transformational leadership was not directly related to team members' average frequency of solution-focused communication ($B = 3.92$, *ns*). Hence, H1a was rejected. We did, however, found a strong significant direct effect of transformational leadership on team members' average counterproductive communication ($B = -5.82$, $p < .05$), supporting H1b.

Our second set of hypotheses focused on the mediating role of leaders' solution-focused communication. In model 2, we added leaders' solution-focused communication as the mediator at the between-level of analysis. We regressed both outcomes on the mediator and also regressed the mediator on transformational leadership style. Finally, we computed indirect effects. The multilevel mediation model had one additional degree of freedom (2 *df*) and showed good fit to the data (comparative fit index = .99, Tucker–Lewis index = .98, RMSEA = .02, SRMRB = .08, SRMRW = .001). Indirect effects are shown in Table 5.

Fig. 1 shows our multilevel mediation model. It is important to note that this figure is conceptual as it does not perfectly correspond to the model that is statistically estimated in MPlus. Leaders' solution-focused statements were positively related to team members' average solution-focused statements ($B = .14$, $p < .05$). The proposed indirect effect of transformational leadership on team members' solution-focused communication via solution-focused leader communication was also significant (4.27 , $p < .01$), thus supporting H2a. Leaders' solution-focused statements were not related to team members' average counterproductive communicative behaviors. Subsequently, we also found no mediation effect and therefore rejected H2b. Instead, we once again found a significant direct effect of transformational leadership on team members' average counterproductive communication ($B = -5.07$, $p < .05$).

Table 4
Results of multilevel mediation analysis.

	Model 1		Model 2	
	Estimate	95% CI	Estimate	95% CI
<i>Within level</i>				
Team members' solution-focused communication on				
Age	0.364 (0.166)	[−0.100, 0.829]	0.364 (0.167)	[−0.103, 0.831]
Gender (0 = female)	4.602 (0.244)	[−3.874, 13.078]	3.872 (0.206)	[−4.408, 12.153]
Tenure	−0.035 (−0.013)	[−0.483, 0.412]	−0.030 (−0.011)	[−0.476, 0.416]
Team members' counterproductive communication on				
Age	0.022 (0.017)	[−0.158, 0.202]	0.022 (0.017)	[−0.158, 0.202]
Gender (0 = female)	3.078 (0.280)	[−7.115, 13.271]	3.136 (0.285)	[−7.112, 13.384]
Tenure	0.244 (0.150)	[−0.018, 0.506]	0.242 (0.149 ^{**})	[−0.019, 0.504]
<i>Between level</i>				
Team members' solution-focused communication on				
Team meeting size	−3.676 (−0.588 [*])	[−7.655, 0.303]	−4.392 [*] (−0.633 ^{**})	[−7.943, −0.842]
Transformational leadership style	3.917 (0.367)	[−2.872, 10.706]	−0.038 (−0.003)	[−6.924, 6.849]
Leaders' solution-focused communication			0.136 [*] (0.591 [*])	[0.011, 0.261]
Team members' counterproductive communication on				
Team meeting size	1.089 (0.227)	[−1.042, 3.220]	1.222 (0.253)	[−1.079, 3.522]
Transformational leadership style	−5.824 [*] (−0.712 ^{***})	[−10.380, −1.267]	−5.074 [*] (−0.617 ^{***})	[−9.366, −0.782]
Leaders' solution-focused communication			−0.026 (−.164)	[−0.079, 0.026]
Leaders' solution-focused communication on				
Transformational leadership style			31.369 ^{***} (0.611 ^{***})	[16.460, 46.278]

Note: Standardized estimates in parentheses. For gender (binary variable), standardized estimates based on StdY standardization in MPlus are reported. For all remaining variables, standardized estimates based on StdYX standardization are reported. For comparability reasons, we display three decimal places. CI = confidence interval.

* $p < .05$.

** $p < .01$.

*** $p < .001$ (two-tailed).

Table 5

Results of multilevel mediation analysis: indirect effects.

	Unstandardized estimates	
	Coefficient	95% CI
Transformational leadership style → Leaders' solution focused communication → Team members' solution-focused communication	4.266*	[1.294, 7.237]
Transformational leadership style → Leaders' solution focused communication → Team members' counterproductive communication	−0.823	[−2.420, 0.773]

Note: For comparability reasons, we display three decimal places. CI = confidence interval.

* $p < .01$ (two-tailed).*Leader effects within the team meeting process: Interaction sequences*

To test H3a and H3b, we examined Lag1 sequences from leaders to followers (i.e., team members). As hypothesized, leaders' solution-focused statements within the meeting process triggered solution-focused team member statements. This event sequence was statistically significant ($z = 4.01$), thus lending support to H3a. Moreover, lag sequential analysis showed that within the meeting interaction process, solution-focused statements by leaders significantly inhibited subsequent counterproductive statements by team members (running off topic, criticizing others, or complaining), as indicated by a significant Lag1 z -value ($z = -5.62$). This finding supports H3b.

Discussion

This study addressed recent calls for a more dynamic conceptualization of leadership in organizations (e.g., DeRue, 2011; DeRue & Ashford, 2010) and applied the perspective of leadership as social problem-solving (Zaccaro & Klimoski, 2001) to understand the influence of transformational leadership during team interactions. Following the idea of leadership and followership as organizational discourse (Fairhurst & Uhl-Bien, 2012), we applied a micro perspective to leader–follower interactions during regular team meetings in organizations. Specifically, we examined how transformational leadership can influence team member reactions during team interactions, and how this influence can be explained (i.e., mediated) by leaders' solution-focused statements. Moreover, we examined how leaders can influence followers' behavior within the moment-to-moment dynamics of team interaction processes.

Findings

Three main findings accrued from this study. First, although transformational leadership style did not directly relate to team members' solution-focused communication, multilevel mediation analysis revealed an indirect effect of transformational leadership via leaders' solution-focused communication (mediator effect). Specifically, our results showed that solution-focused leader behaviors such as communicating visions, proposing and describing solutions, and analyzing solutions mediated the relationship between the observed transformational leadership style and solution-focused follower behaviors. Second, we found a direct negative link between transformational leadership and team members' counterproductive communication. However, solution-focused leader communication did not show a significant mediating effect in this relationship, indicating that the buffering effect of transformational leadership

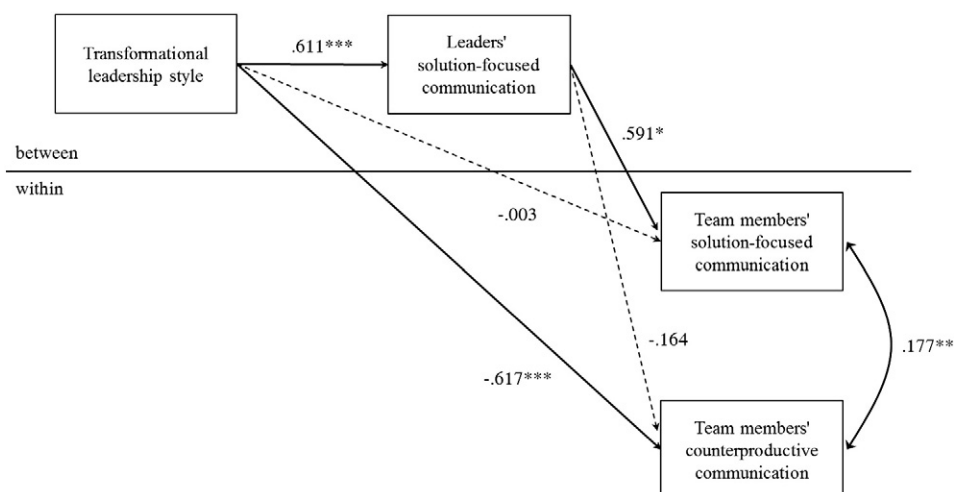


Fig. 1. Effects of transformational leadership style on team members' communication via leaders' solution-focused communication. Note: Multilevel mediation model showing direct effects. Standardized coefficients are shown. For better comparability, we display three decimal places. Control variables (age, gender, tenure, team size) were entered in the analysis at particular levels but are omitted for the sake of clarity. * $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed).

against counterproductive behavior by team members is direct and does not necessarily require intermediate solution-focused communication by leaders.

Third, we used lag sequential analysis in order to explore the moment-to-moment behavioral dynamics between leaders and followers within team interactions. At the micro-level of leader and follower utterances, our findings showed that leaders' solution-focused statements triggered subsequent solution-focused follower statements within the team interaction process. Moreover, solution-focused leader statements inhibited subsequent counterproductive follower behaviors such as running off topic, criticizing others, and complaining, which are known to derail team problem-solving processes and diminish team effectiveness (Kauffeld & Lehmann-Willenbrock, 2012). These findings indicate that leaders can set the tone for more functional interaction during team meetings.

Theoretical implications

Our findings have several implications for leadership research. First, our results align with the notion of leadership as social problem-solving (Zaccaro & Klimoski, 2001; Zaccaro et al., 2001) by highlighting the role of leadership during complex problem-solving interactions in teams. Our findings show that transformational leaders can trigger idea generation and solutions by team members, which corresponds to the notion of sensemaking and sensegiving through leadership in team settings (Weick, 1995; Zaccaro et al., 2001; see also Scott et al., 2015, for a discussion of sensemaking in the particular context of organizational meetings). Solving problems and generating innovative solutions constitute one of the most important functions of holding team meetings in organizations (e.g., Liker & Franz, 2011). In the context of team problem-solving meetings, previous research shows that the more meeting time is spent on talking about solutions and exploring ideas, the higher team members' meeting satisfaction and subsequent team productivity (Kauffeld & Lehmann-Willenbrock, 2012). This suggests that transformational leaders who show model behavior, in terms of contributing their own ideas, can not only inspire team members to generate their own solutions during team interactions but can also foster team effectiveness beyond the meeting context.

Our finding that transformational leaders can foster solution communication in followers also supports the idea of "leading by example." This idea is central particularly to charismatic or transformational leadership theories (e.g., Bass, 1985; Conger & Kanungo, 1987; Shamir, House, & Arthur, 1993). Previous empirical research on the effects of leader role modeling on follower behavior remains sparse, although some empirical findings suggest that leading by example can meaningfully impact follower attitudes and behaviors in the workplace. Specifically, Yaffe and Kark (2011) found that exemplary organizational citizenship behavior (OCB) by leaders was linked to group-level OCB. Moving beyond self-reported behaviors, our findings show that leading by example also takes place at the micro-level of observed team interactions. Moreover, our findings relate to the concept of behavioral integrity or "the perceived pattern of alignment between an actor's words and deeds" (Simons, 2002, p. 19). In the context of leader–follower relationships and interactions, behavioral integrity includes followers' perception of a fit between a leader's words and actions. In other words, a leader's behavior should correspond to his or her professed leadership style (e.g., Davis & Rothstein, 2006; Dineen, Lewicki, & Tomlinson, 2006). Our finding that transformational leaders can elicit solution behavior in followers, via communicating about solutions themselves, aligns with research showing that leaders with behavioral integrity can enhance followers' performance (Palanski & Yammarino, 2011).

Second, our study addresses calls for research on the link between transformational leadership and counterproductive work behaviors (Wang et al., 2011). Notably, we did not find the expected mediating effect of solution-focused leader behavior in the link between transformational leadership style and counterproductive team member behaviors. Instead, transformational leadership style showed a direct negative effect on counterproductive follower behaviors in the observed team interactions. This finding suggests that additional mediating leader behaviors might play a role in the interplay between transformational leadership style and counterproductive team member behavior. Arguably, transformational leadership style not only facilitates solution-focused leader behaviors but other leader behaviors as well, which in turn might explain the inhibiting effect of transformational leadership style on counterproductive team member behaviors.

However, at the micro-level of leader and follower utterances over time we did find that leaders' solution communication inhibited counterproductive communication by team members. Previous research has shown that these counterproductive verbal behaviors can quickly derail the meeting process, for example by building negative complaining spirals (Kauffeld & Meyers, 2009; Lehmann-Willenbrock et al., 2011). To date, little is known about potential ways to buffer against these counterproductive verbal behaviors during team interactions. Our findings make an important step in this direction by showing that leaders can play an important role for inhibiting these negative team behaviors. Rather than helplessly watching the team running off topic or getting stuck in complaining mode, leaders can actively manage the team interaction process by focusing on solutions and new ideas.

Third, our sequential analysis findings underscore the importance of considering leadership at the micro-level of interaction moments over time. Our findings suggest that leaders can deliberately trigger solution patterns in teams (cf. Kauffeld & Meyers, 2009). This highlights leadership during team meetings as an important context not only for exploring team leadership (Baran et al., 2012), but also and especially for understanding leadership within the complex dynamics of team interaction processes in the workplace. Moreover, our findings concerning the moment-to-moment behavioral contingencies in leader–follower communications correspond to earlier survey research on reciprocity in follower reactions to leaders (e.g., Wayne, Shore, Bommer, & Tetrick, 2002) and to earlier laboratory findings on reciprocal interaction patterns between randomized manager–subordinate pairs (Komaki & Citera, 1990). However, we extend these earlier findings by showing that such reciprocal patterns can be found in behavioral leader–follower interactions in the organizational context as well. This suggests a powerful leadership tool for managing team dynamics, especially in

complex situations such as team meetings where strategies for managing dyadic conversations with individual team members may no longer apply.

Fourth, although leadership theory is beginning to acknowledge the dynamic features of leadership and followership (e.g., DeRue & Ashford, 2010; Van Vugt, Hogan, & Kaiser, 2008), empirical efforts toward an understanding of leadership as a relational process remain sparse. One reason for this empirical gap is the lack of adequate methods. The present study shows how fine-grained interaction analysis can help address this gap and addresses recent calls to capture leadership as a dynamic, context-embedded social process (e.g., Fairhurst, 2009; Marion & Uhl-Bien, 2001; Osborn, Hunt, & Jauch, 2002). By using video data from actual team interactions in organizations, our results are based on a realistic and dynamic leadership setting. Prior leadership studies have typically relied on global descriptions of leadership style (e.g., Bass, 1997; Conger, Kanungo, Menon, & Mathur, 1997; Fleishman, 1973). Rather than asking for potentially biased follower ratings (Graen et al., 2010) of their leaders' style, we utilized two teams of independent raters, one for coding the utterance-to-utterance interaction process and one for rating transformational leadership style. Our findings show that transformational leadership affects team members' observable verbal reactions to the leader, via an increase of observable solution communication by the leader. Moreover, our findings from lag sequential analysis provide new insights into the moment-to-moment dynamics of leadership in organizational settings. By showing how specific verbal leader behaviors can trigger interaction patterns in teams, our study sheds light on the micro-level processes that underlie transformational leadership influence in dynamic team settings. As such, our overall findings also contribute to the construct validity of transformational leadership, which has been challenged recently (Dinh et al., 2014).

Finally, in addition to identifying specific leader–follower behavioral linkages, our fine-grained process analysis highlights the need to account for *temporal* dynamics when aiming to understand leadership and followership in organizational settings. Scholars have repeatedly pointed out the need to consider time in research on team processes (e.g., Cronin et al., 2011; Kozlowski et al., 2013). The present findings show that this need applies to leadership in team settings as well, as both leader and team member behaviors are embedded within the temporal process of team interactions. Team meetings are one place where these temporal dynamics become observable and thus offer a rich basis for further exploring emergent interaction patterns between leaders and followers.

Managerial implications

Employees spend at least 6 h per week in meetings on average, and substantially more time if they are part of larger organizations or if they hold a managerial position (for an overview, see Allen, Lehmann-Willenbrock, & Rogelberg, 2015). As such, meetings constitute an important workplace context in which leadership is enacted in several ways (Allen & Rogelberg, 2013; Schwartzman, 1989). Moreover, because most employees rarely find themselves in one-on-one situations with their leader, meetings are often key sites for showing leadership skills (Ravn, 2013). To make meetings worth everyone's while, leaders should strive to create constructive meeting processes. As an implication for practice, the present results suggest that transformational leadership can be helpful not only for promoting effective meetings but also for effectively managing team problem-solving processes. Previous research shows that transformational leadership can be actively developed (Avolio, 1999; Barling, Weber, & Kelloway, 1996). Moreover, our findings pinpoint very specific verbal behaviors that leaders can use to achieve this aim. Leadership development programs could train leaders for running more effective meetings by focusing on solution-focused communication and sensitizing them for the value of these communicative behaviors in terms of triggering beneficial follower responses during team interaction processes.

More broadly speaking, our findings suggest that leaders can utilize team meetings not only as sites for team problem-solving, but also as a means to build and shape leader–follower relationships (cf. Baran et al., 2012). This idea aligns with practitioner recommendations that leaders should learn to love rather than hate their meetings (e.g., Lencioni, 2010). Meetings are places where leaders can encourage empowerment, share knowledge, develop ideas, and accomplish organizational goals with their team (e.g., Allen & Rogelberg, 2013; Malouff, Calic, McGrory, Murrell, & Schutte, 2012). Our process-analytical findings provide very specific behavioral recommendations for achieving these aims.

Furthermore, meetings can provide access to team dynamics that may otherwise be hidden from leaders. Rather than perceiving meetings as a hassle or a waste of time, leaders should embrace meetings as an opportunity for creating and managing the micro-processes inherent in team dynamics. For example, whether a team meeting is spent on solving problems and generating solutions, rather than criticizing and complaining, not only reflects qualities of the leader but also yields insights into the dynamics that characterize most team processes (e.g., Cronin et al., 2011). Our results suggest that leaders would be wise to become attuned to the moment-to-moment dynamics during team interactions. Leadership development could incorporate reflection components in this domain, in order to improve meeting leadership, team process management, and ultimately organizational effectiveness.

Limitations and future research

As any empirical investigation, this study has several limitations. First, we used data from team meetings in semi-autonomous teams. Group leaders were elected team members. Thus, we did not examine hierarchical supervisor-led meetings. Nevertheless, we did find significant links between leaders' transformational leadership style, leaders' behaviors, and team members' behaviors. This indicates that the elected group leaders were in fact rather influential in terms of the observed meeting processes and emergent team interaction patterns. However, future research should explore whether the present findings can be substantiated in more hierarchical leader–follower settings. Hierarchy or power differentials could also present a boundary condition for the behavioral linkages between leader and follower solution behavior as observed in the present study. For instance, in more hierarchical leader–follower

settings, views and problem solutions expressed by the team leader might inhibit rather than enhance solution contributions by team members. Future research should explore this idea.

Second, our multilevel mediator model does not lend itself to any firm causal conclusions. Future research could employ a longitudinal design to examine whether the effects identified in the present study would hold across time. At the event level however, our results do suggest causal linkages between leaders' solution behavior and team members' subsequent conversational acts (for similar applications and interpretations of sequential analysis, see Kauffeld & Meyers, 2009; Lehmann-Willenbrock et al., 2013; Lehmann-Willenbrock & Allen, 2014). Nevertheless, future research should also explore mutual effects between leaders and team members during team interactions. It is conceivable that leaders not only influence team members, but that team members influence their leader as well. For example, functional team communication might encourage leaders to behave in more transformational ways. Moreover, future research could explore whether followers can enhance their leaders' communication behaviors as well.

Third, although the observer rating approach of transformational leadership provided us with more objective data compared to traditional post-hoc follower ratings, we did not account for team members' personal views of their leader. Future research should include different sources of data to measure leadership in team interactions such as leader self-reports, team members' ratings, and observer ratings. These different sources of data can provide further insights into the relationship between team leadership and team member behavior. Similarly, future research could explore whether observer ratings of leader behavior will differ from self-ratings by leaders or ratings by team members. Any discrepancies in findings obtained from these different methods can yield useful insights (e.g., Lehmann-Willenbrock & Chiu, 2013) and lay the ground for leadership development.

Fourth, whereas our findings on behavioral linkages between leaders and team members were based on time-series behavioral data, our multilevel findings were based on a cross-sectional design. This limitation implies that we cannot rule out the possibility of a different direction of the identified mediator effect (i.e., leaders' solution communication affecting team members' meeting behaviors via an emergent transformational leadership style), although our current model is more intuitive. Future research should explore the potentially mutual effects between leader communication and the emergence of a transformational leadership style.

Finally, future research should explore whether our findings generalize to samples from different industries or organizational settings and with different gender compositions. Moreover, the present findings are based on a German sample. Previous research suggests that team interaction behavior can differ substantially across cultures (Lehmann-Willenbrock, Allen, & Meinecke, 2014). Hence, future research should investigate how the influence of transformational leadership during team interactions (such as team meetings) and the role of intermediate processes (such as leaders' solution communication) may differ across different cultural backgrounds.

In sum, this study shows that transformational leadership is observable and impactful at the micro-level of team interaction processes. We hope that our findings will inspire future behavioral process research on leadership in organizations, in order to promote our understanding of how leaders manage the social and temporal complexity of team interactions.

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